HMA Longitudinal Joint Construction Evaluation

Research Seminar

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December 15, 2015

The Weak Link

Longitudinal Joints

- About 4% (280 miles) of all the bituminous roads rated in 2015 have Medium and/or High Severity Longitudinal Joint Distress.

- The problem is worse than this because the current pavement vans do not always see the centerline joint due to driver wander.

- About 9% (606 miles) of bituminous roads rated in 2010 had either Medium and/or High Severity Longitudinal Joint distress when the vans field of view was wider.


Medium and High Severity
Longitudinal Joint Distress

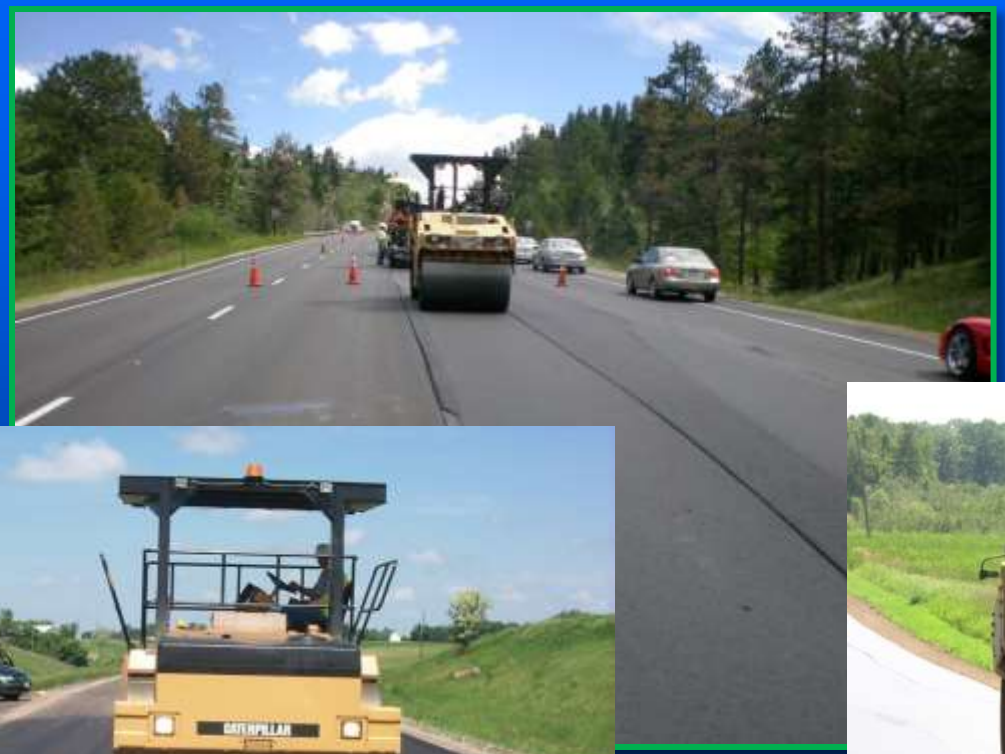
High Severity Longitudinal Joint Distress

High Severity Longitudinal Joint Distress

Current Initiative

- Longitudinal Joint Improvement
  - Industry tasked with providing a potential improvement to joint construction method.
- Industry responded with “Maryland” method of joint construction.

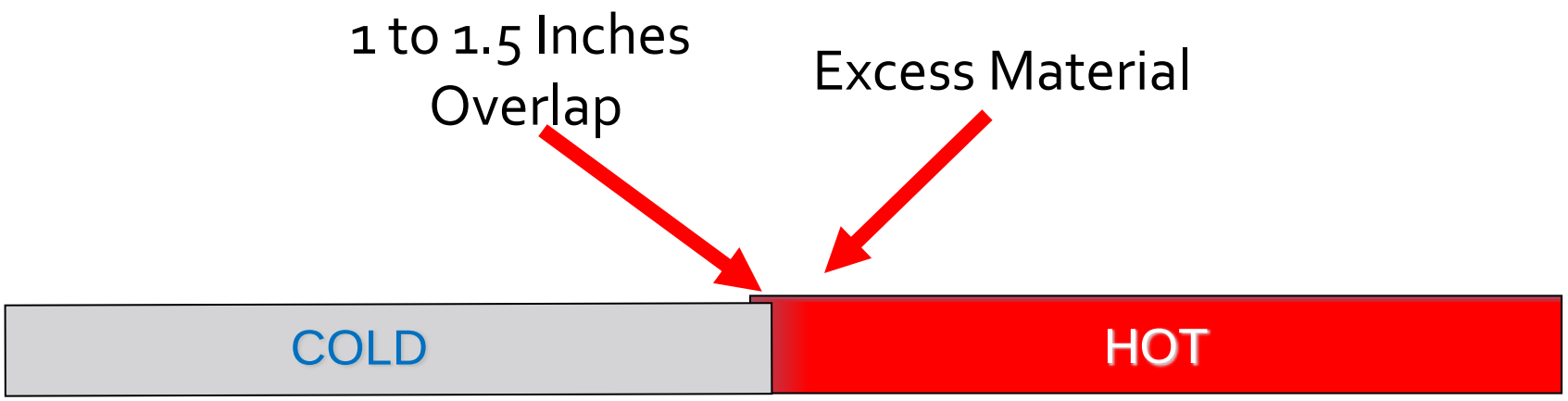
Maryland Joint Construction Method



Maryland Joint Method

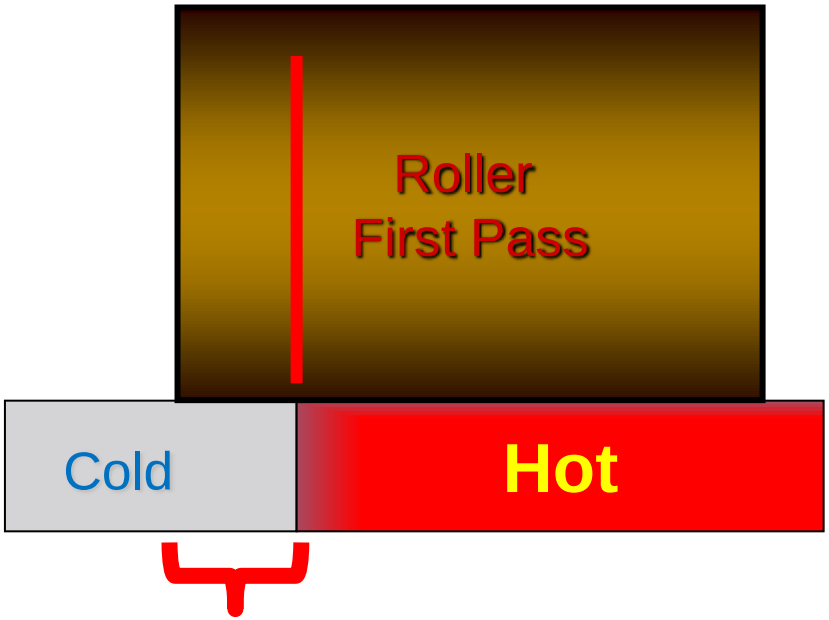
Longitudinal joints constructed adjacent to the existing HMA pavements overlap the existing pavement by 1″ to 1.5″ and be about ¼″ higher.

Maryland Joint Overlap



Joint Compaction Option 1

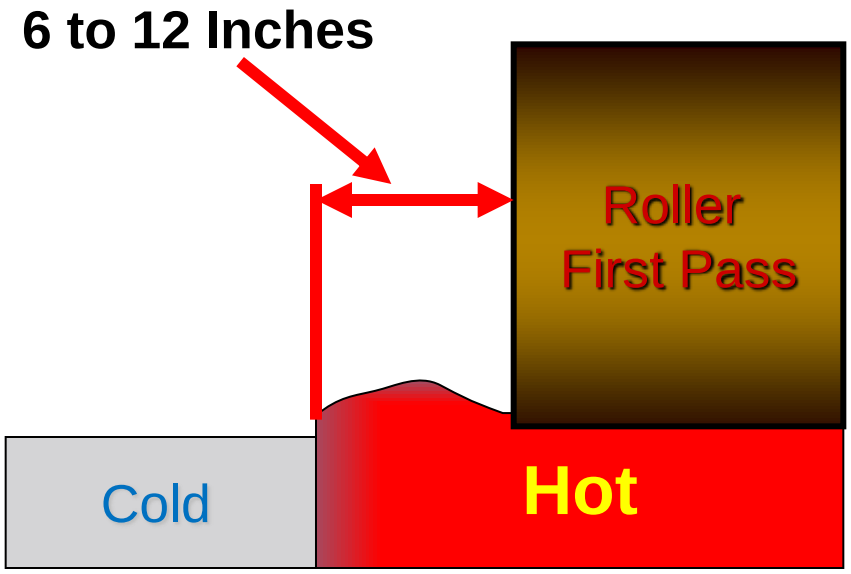
First Roller Pass



Approx. 6” Overlap

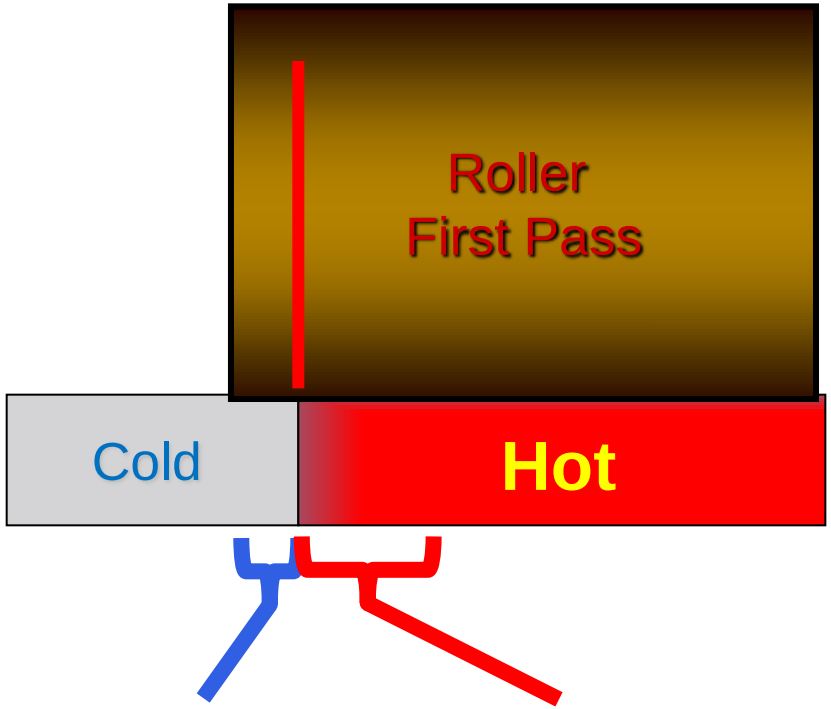
Joint Compaction Option 2

First Roller Pass



Creates a Confined Edge & Raised Area

Second Pass

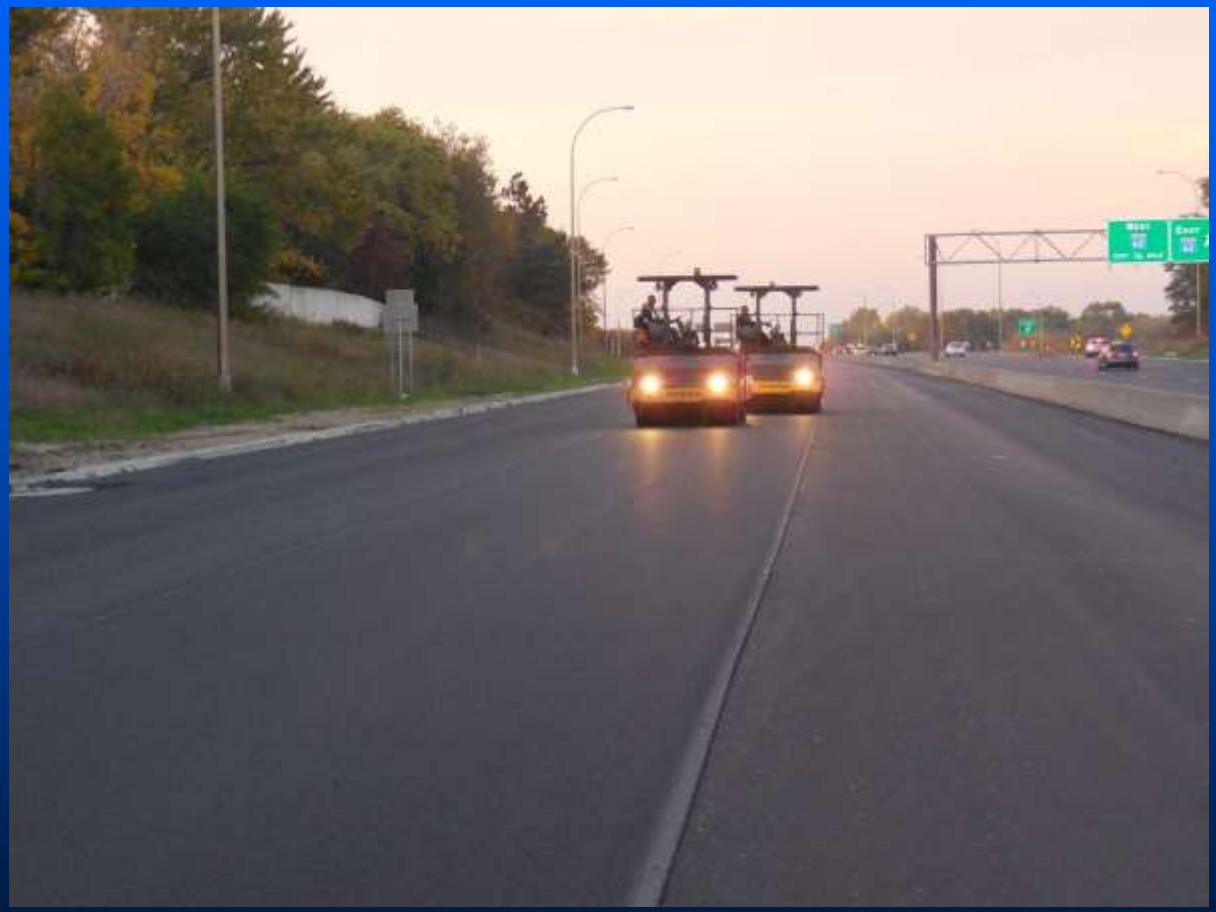


1” to 1.5” Inches + Remaining Uncompacted

Second Pass

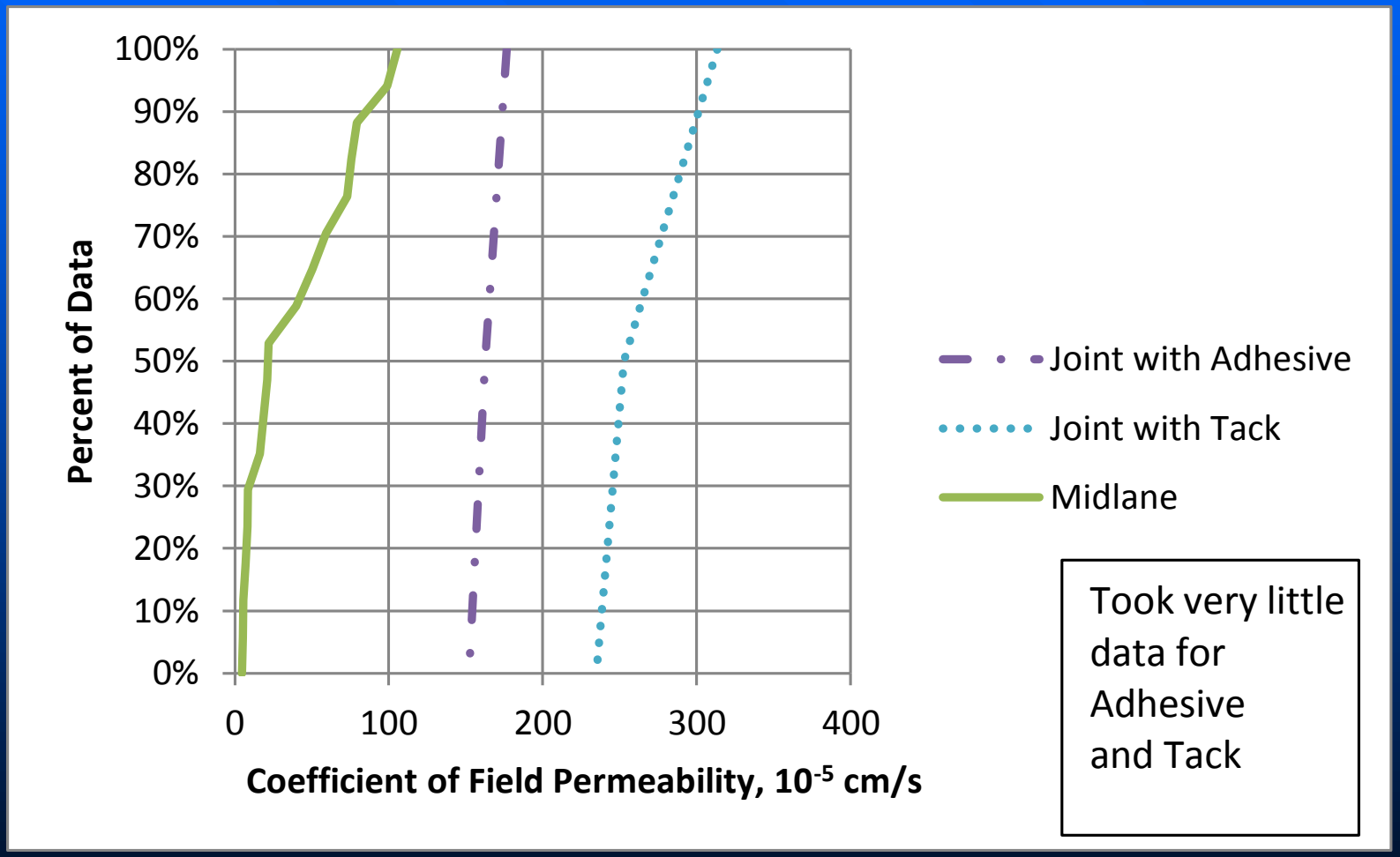
TH 100 Joint Overlap

Crushed Aggregate of Overlap

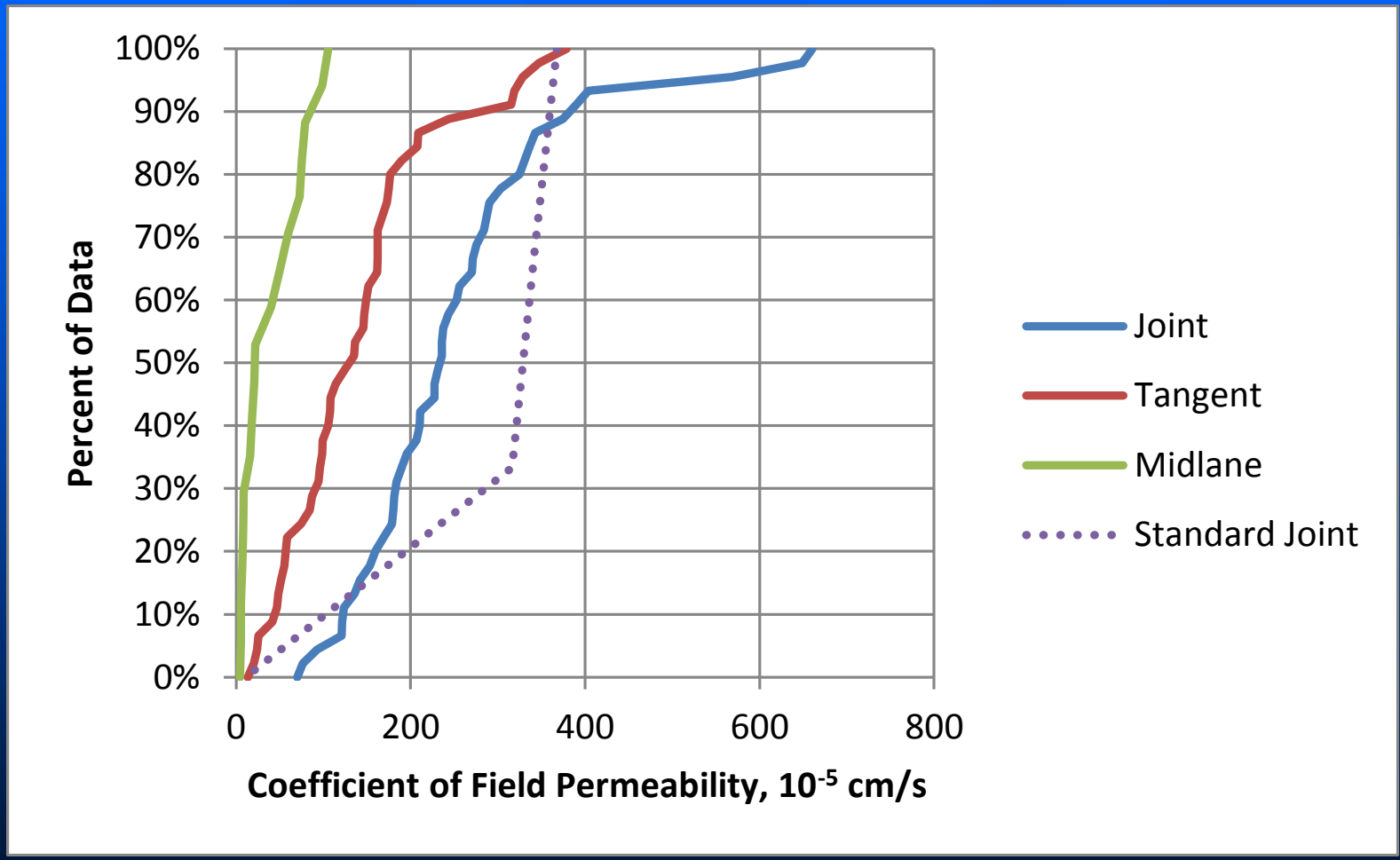


Coring & Permeability Testing

Permeability: Midlane versus Treated Maryland Joints (2014)



Permeability: Top Lift Locations (2014)



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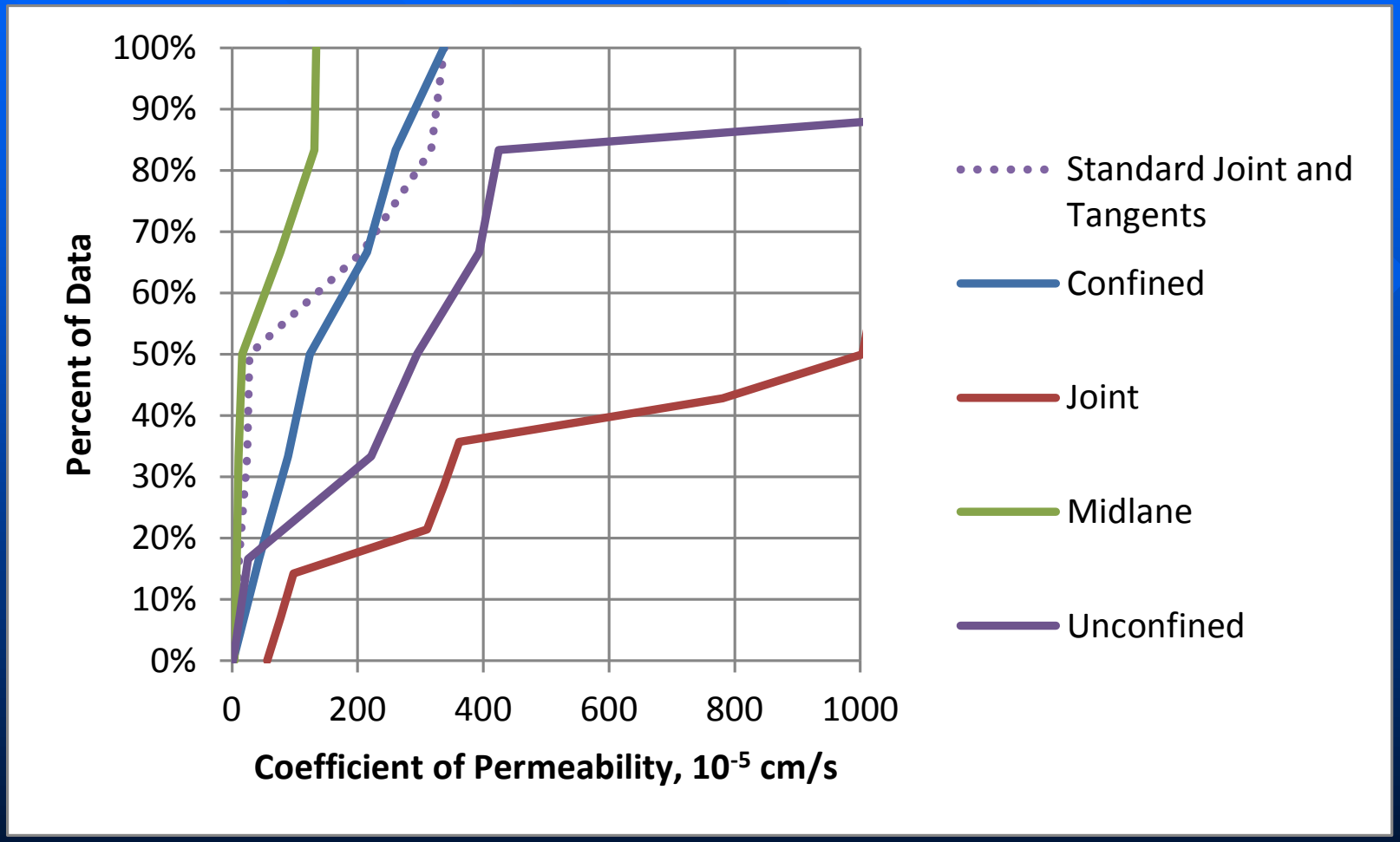
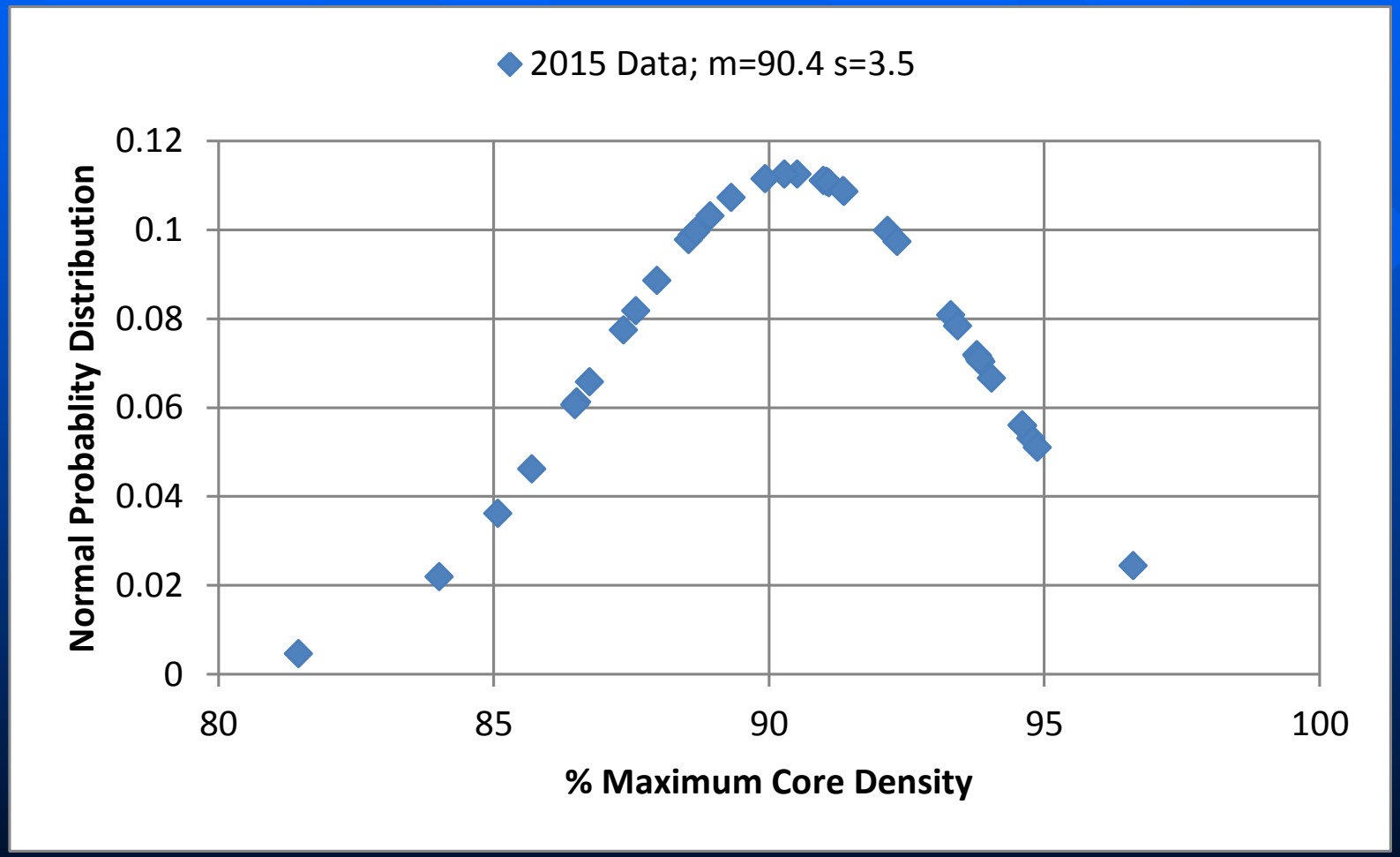


Density: 2015 Projects



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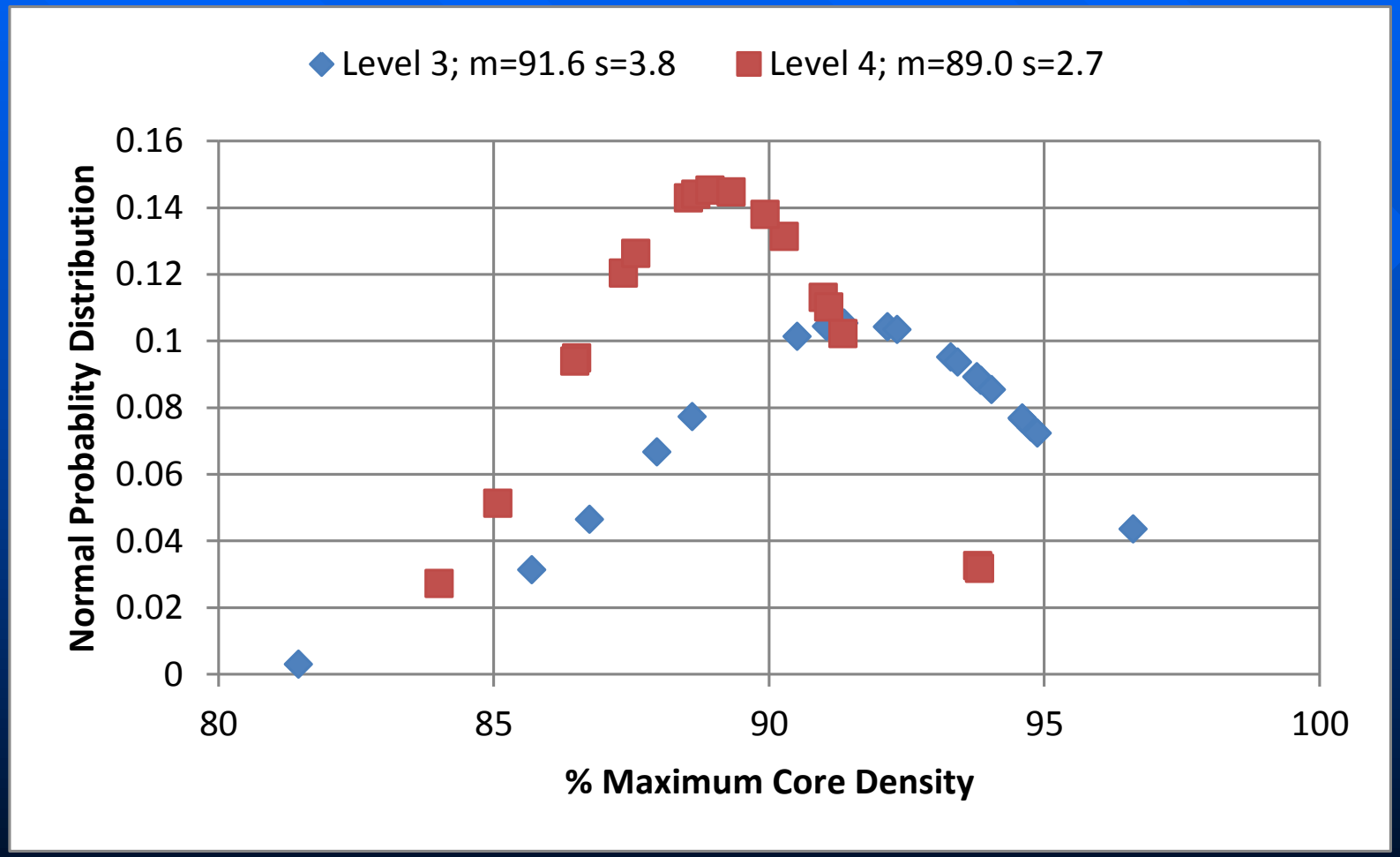

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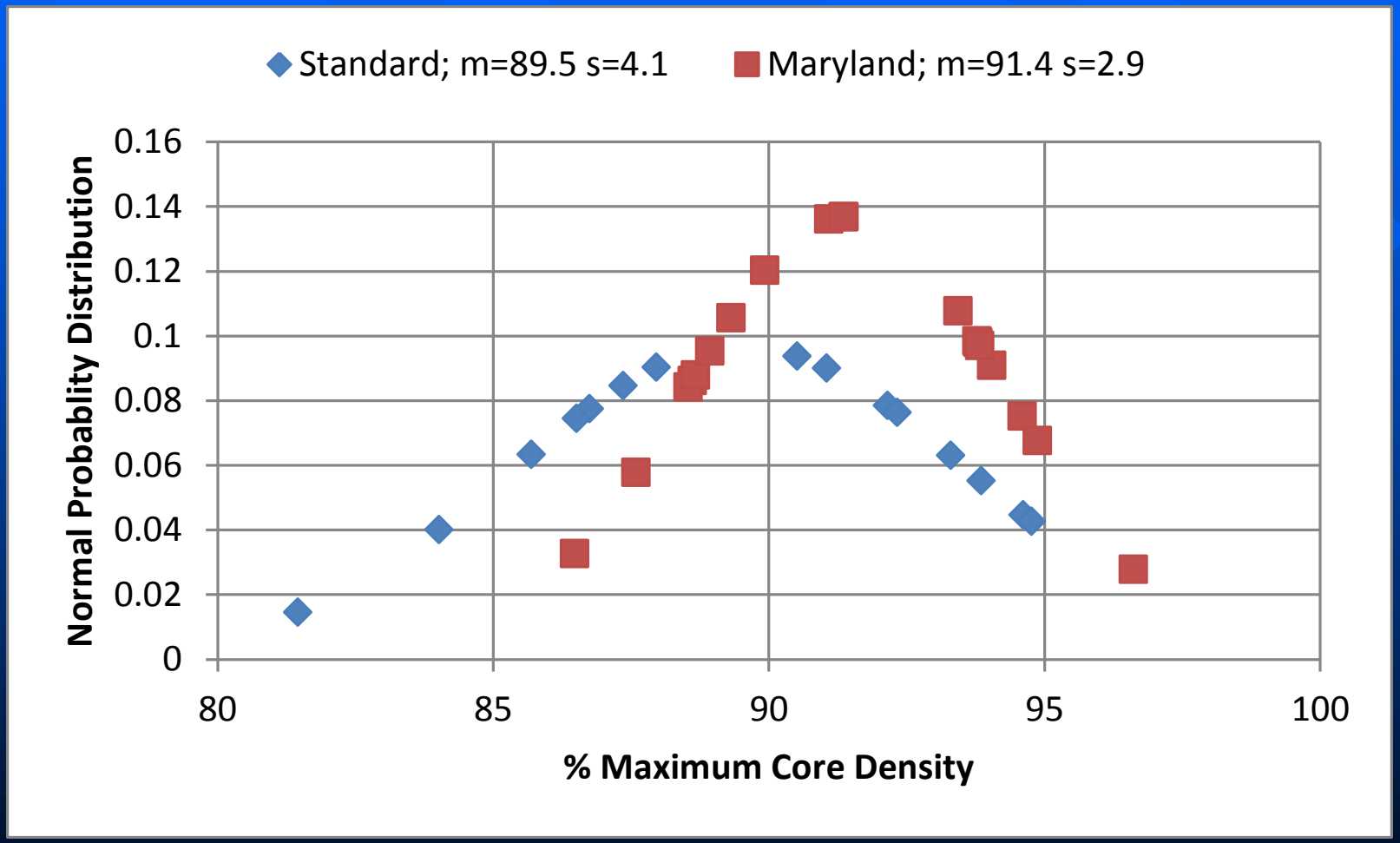
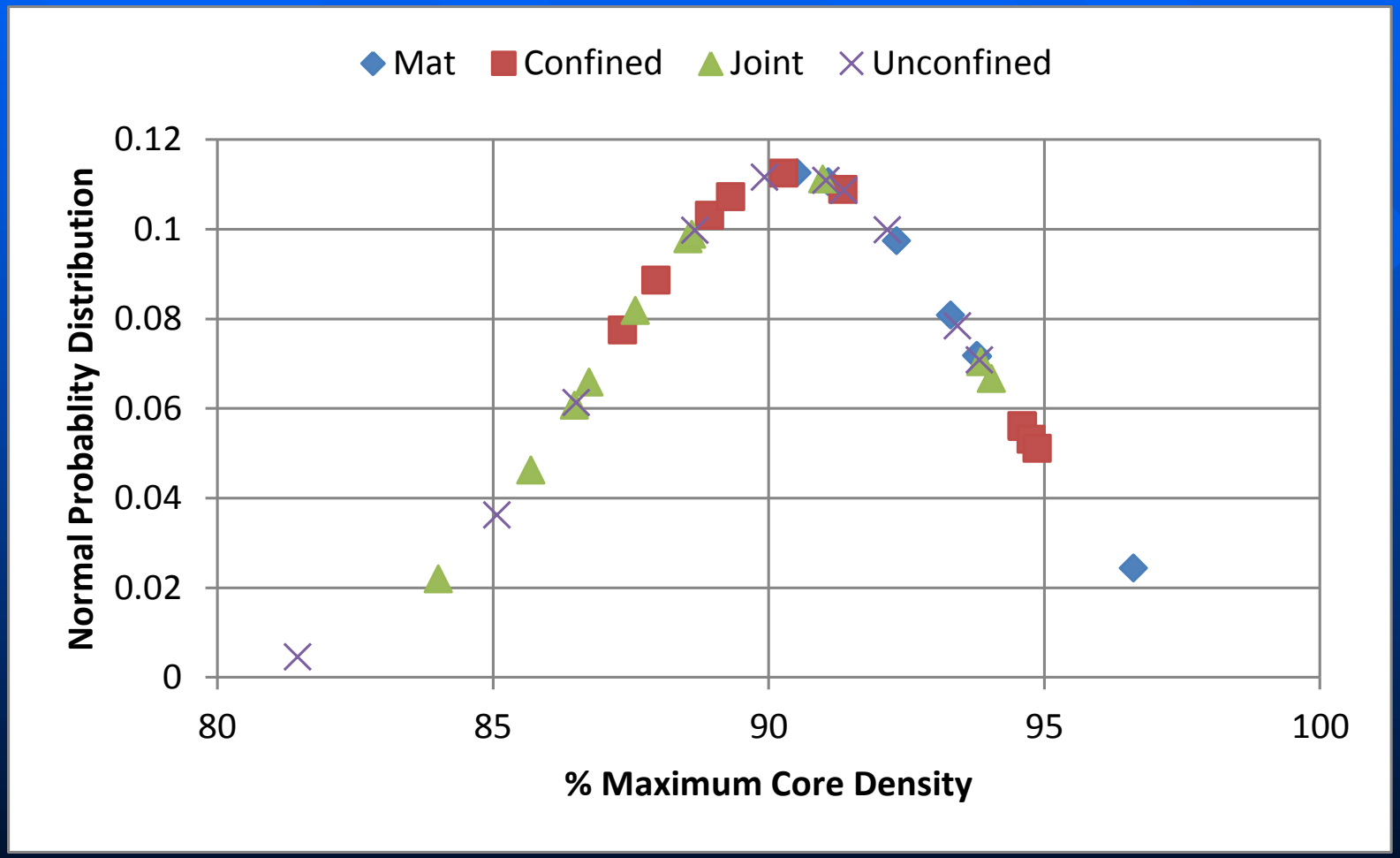


Density: 2015 Projects



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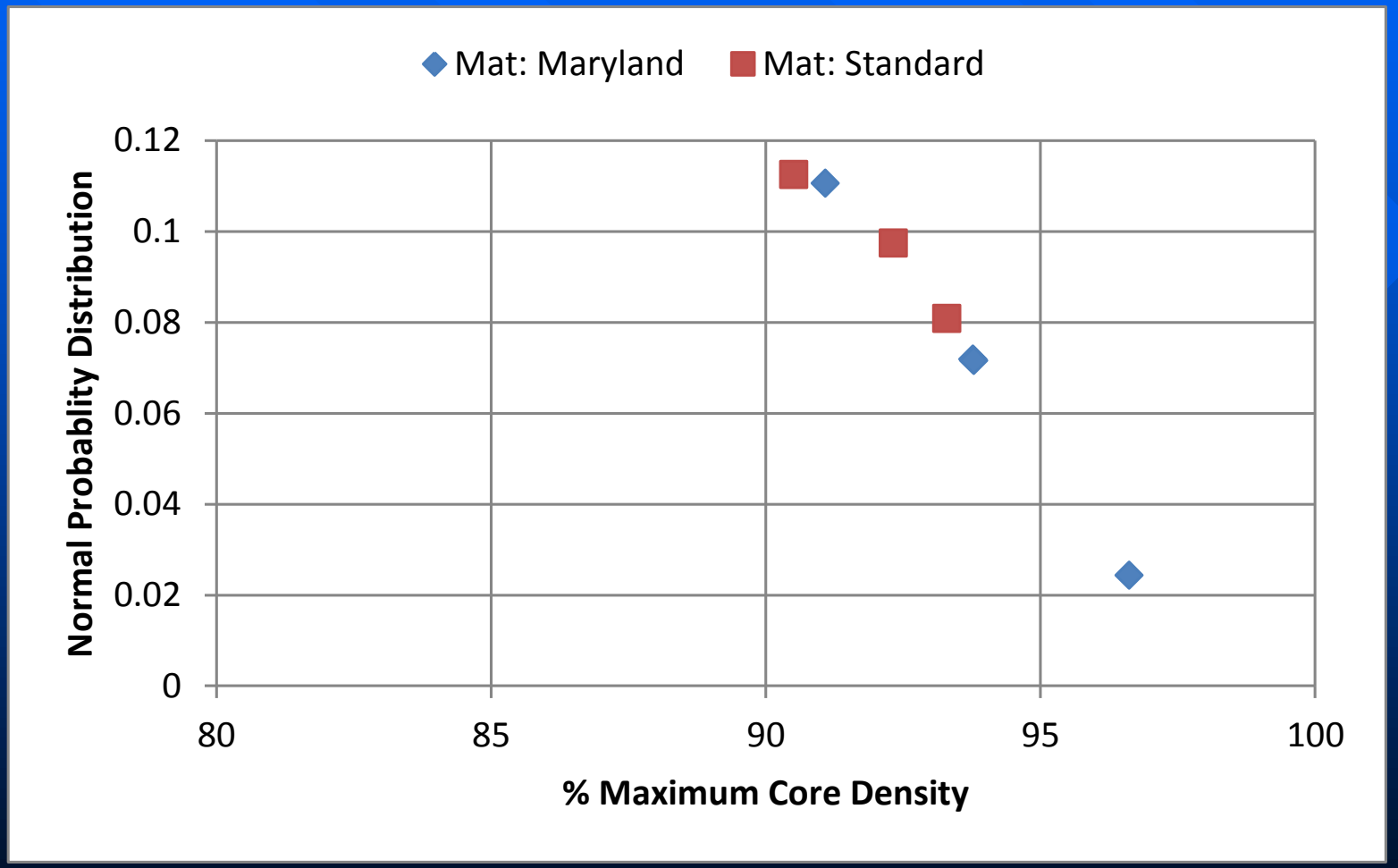
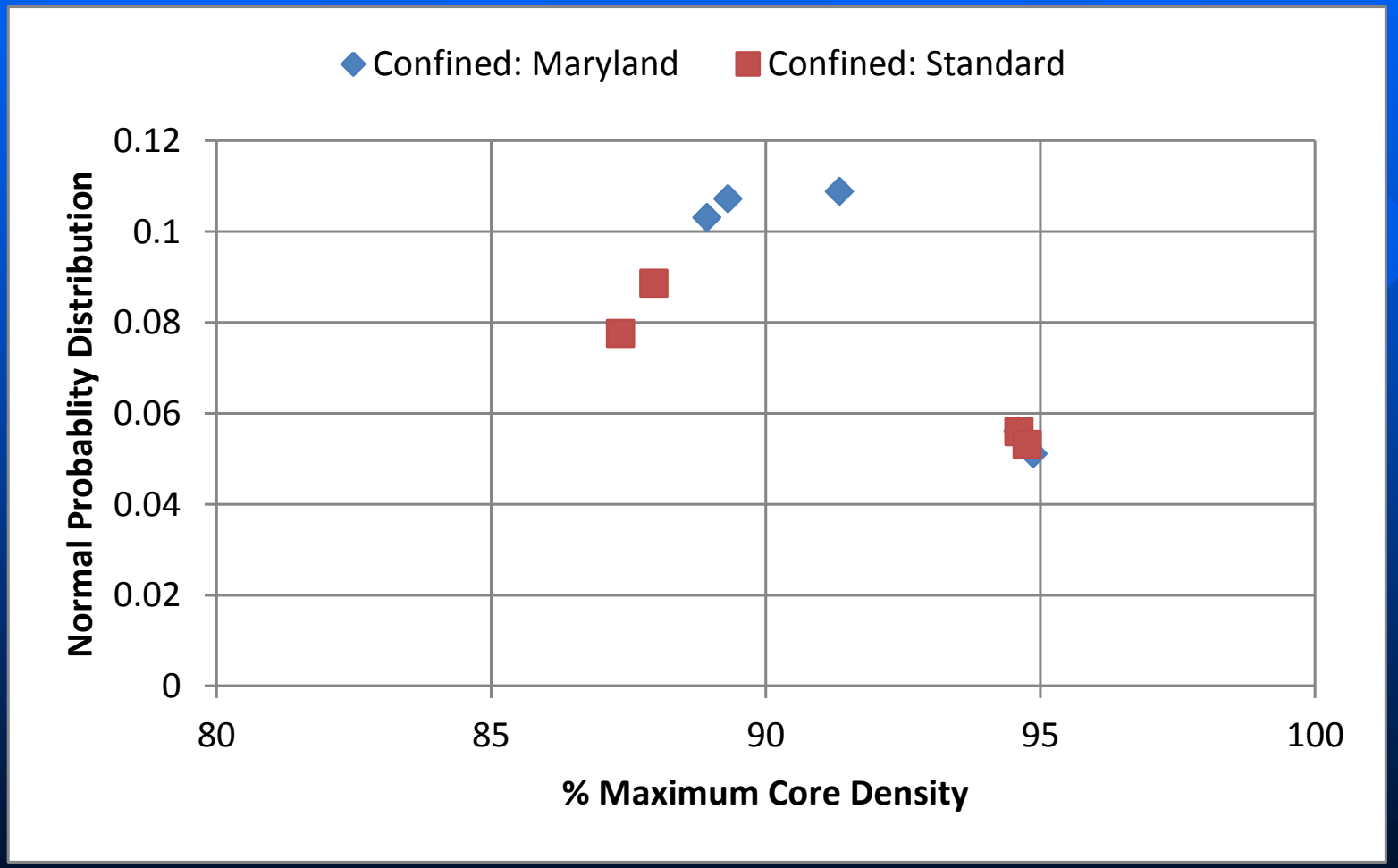


Density: 2015 Projects



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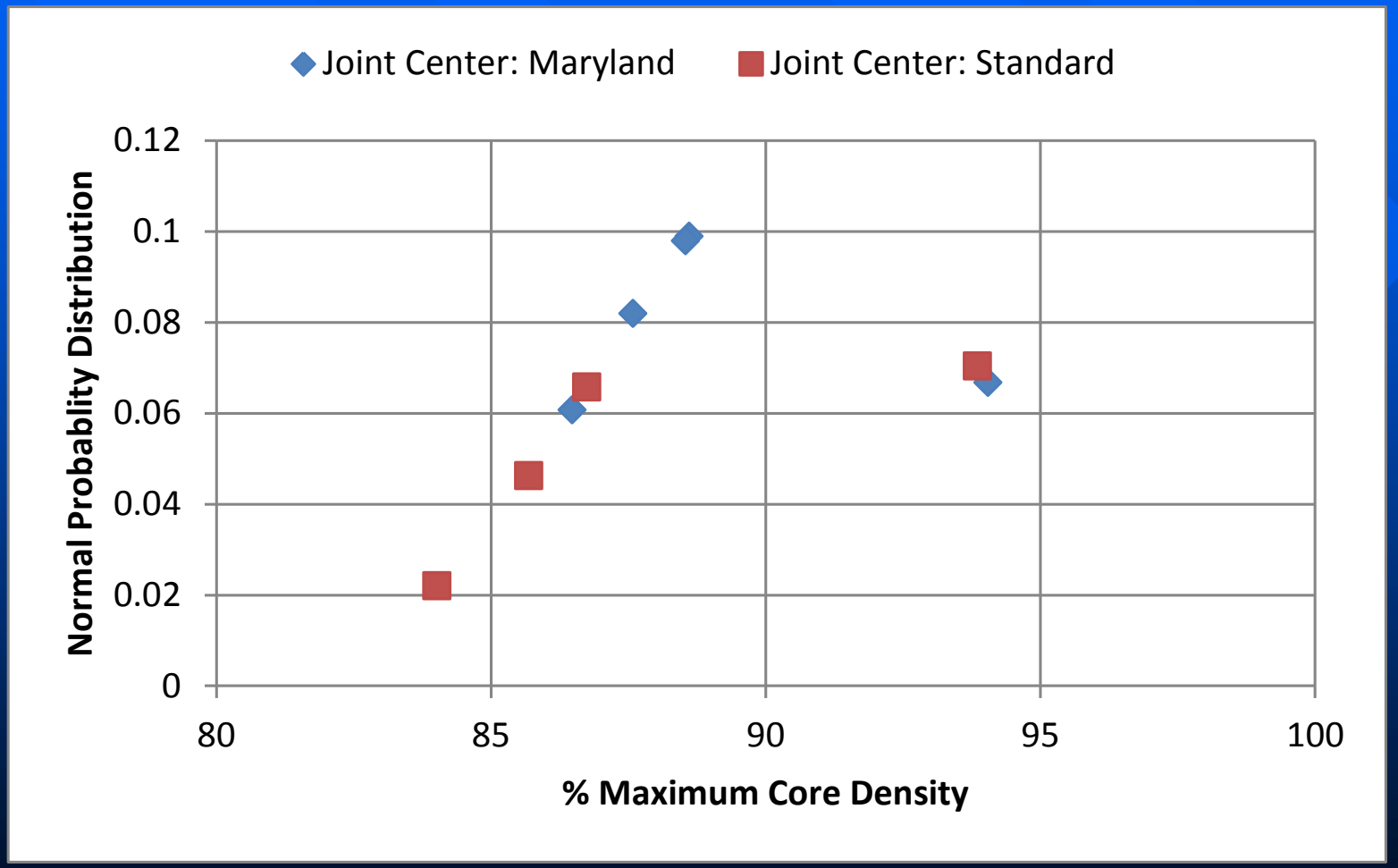
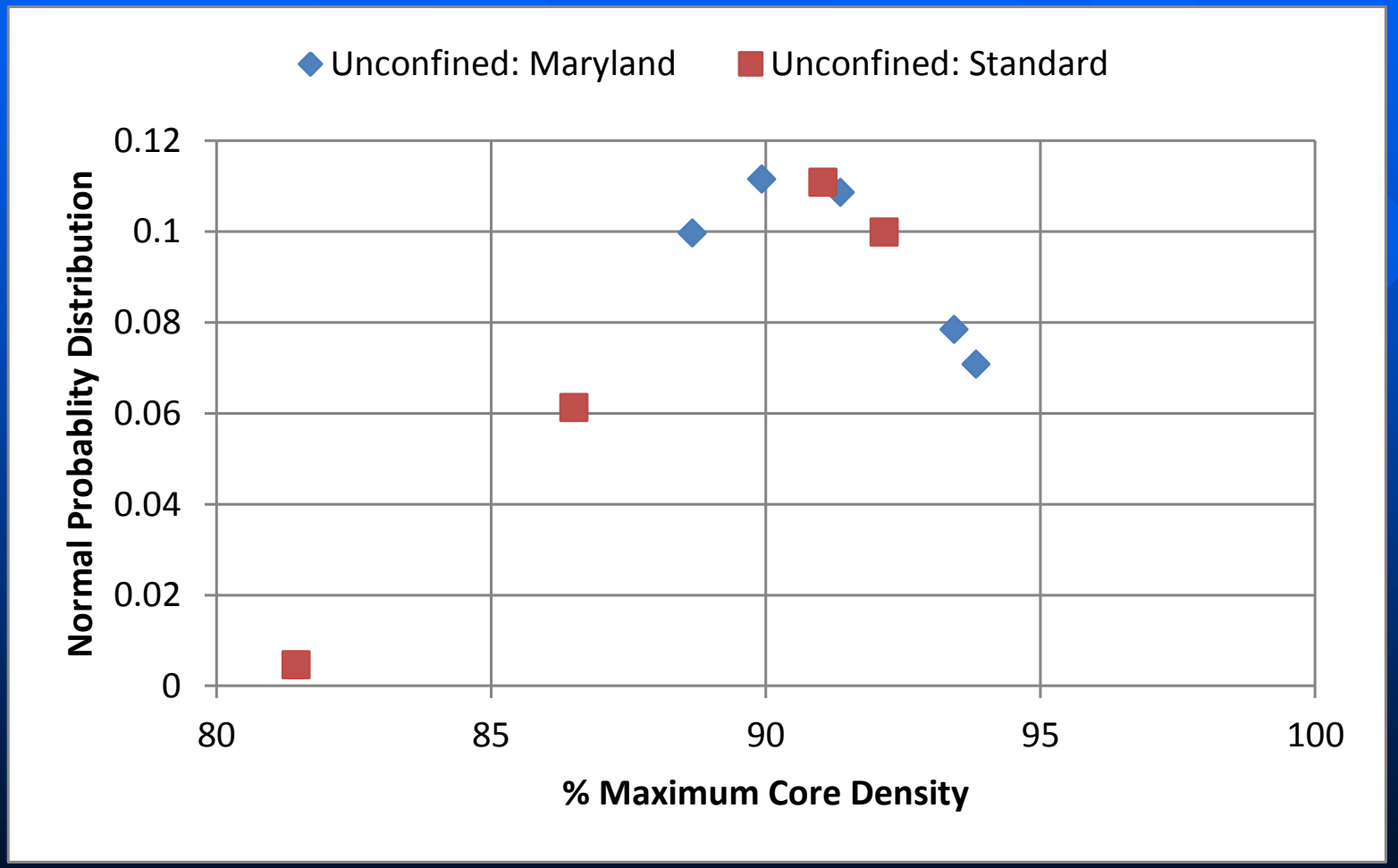
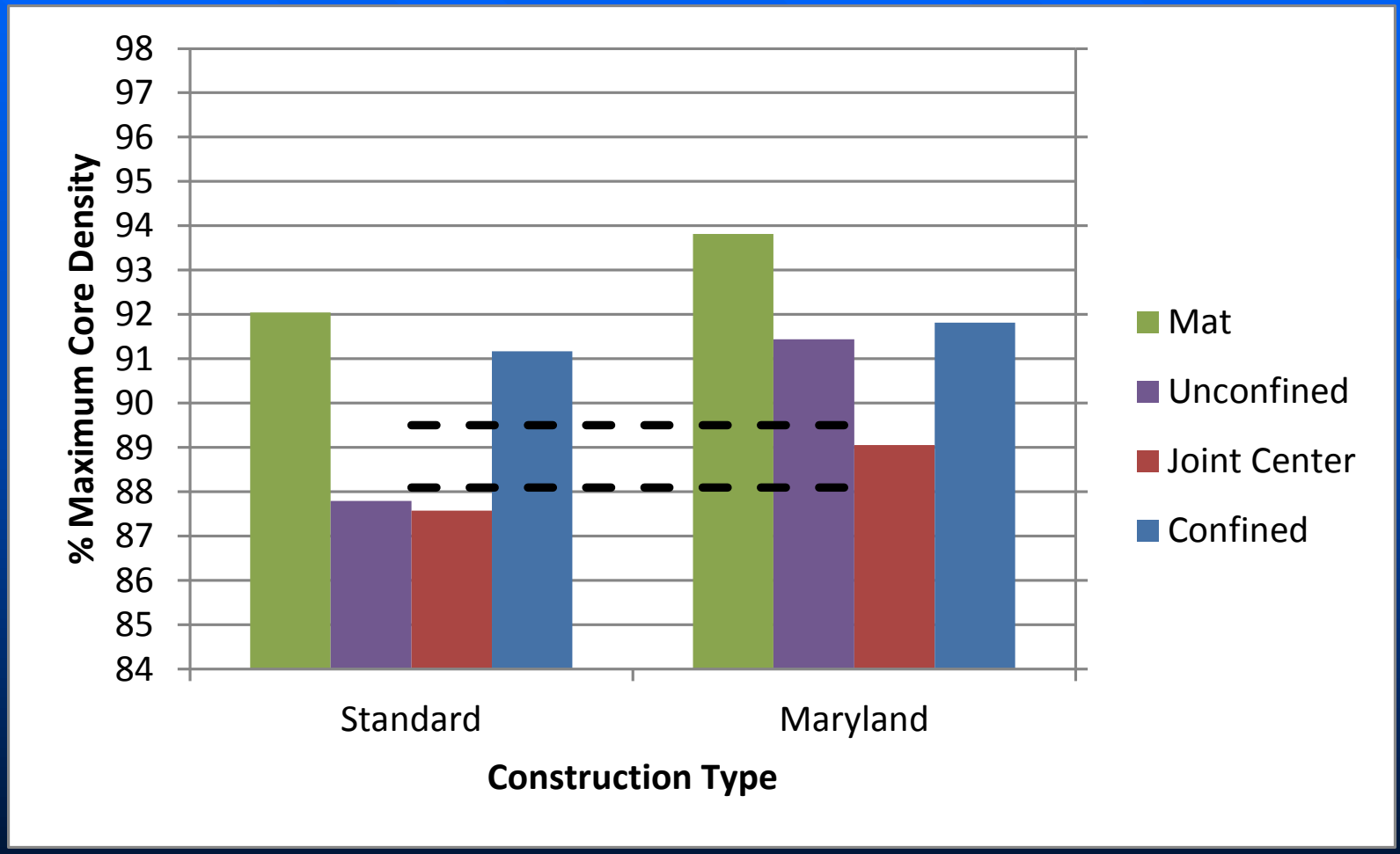


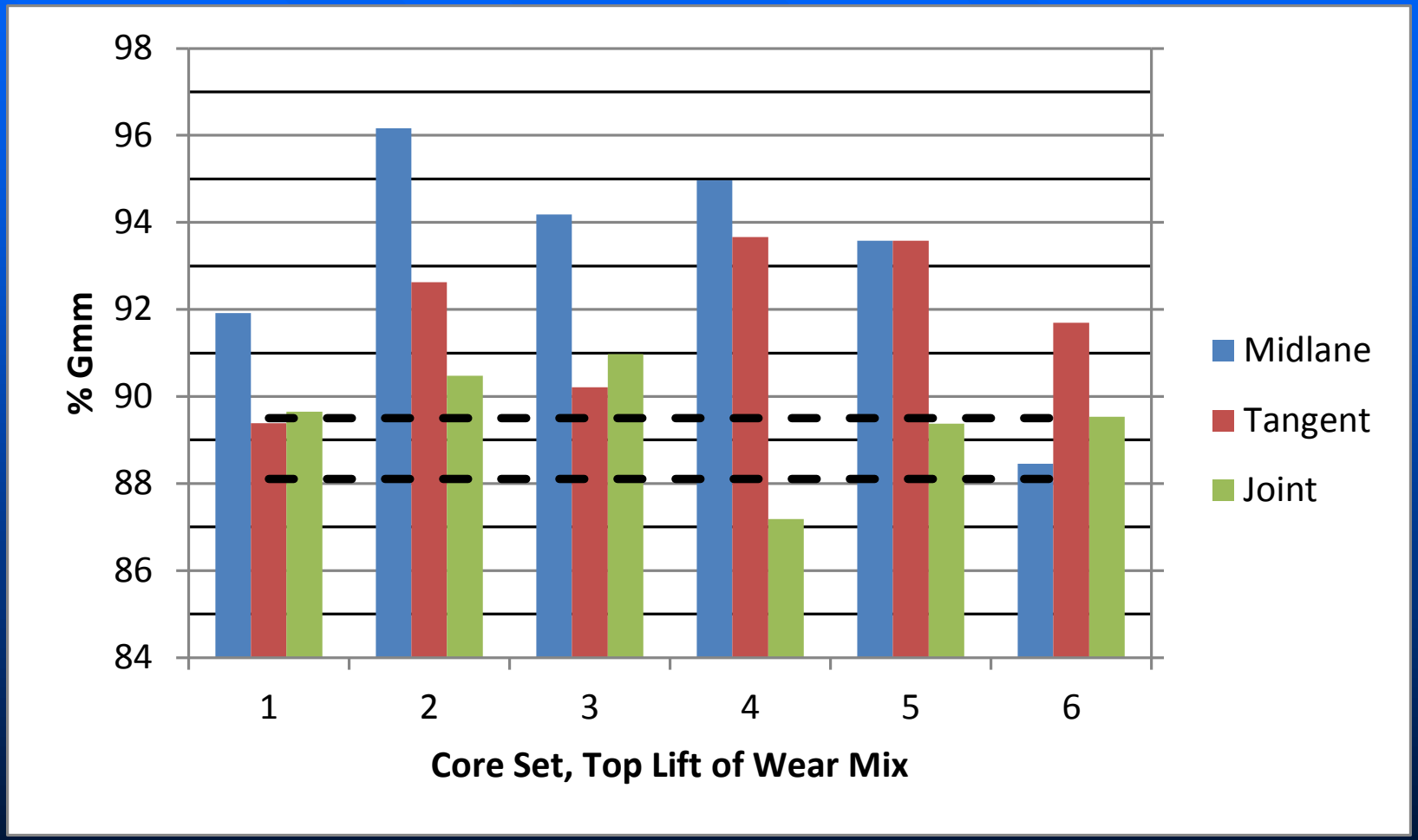
Density: 2015 Projects



Density Averages: 2015 Projects



Core Density of Maryland Joint (2014)



Summary

- Maryland Joint Method:
  - Appears to be less permeable than standard practice.
  - Indicates better longitudinal joint density
- Expectations – Better Performance

Designing for Improved LJ's

- Specifying 9.5mm (-1/2") mix on final surface.
- Utilizing echelon paving when practical.
- Including longitudinal joint density requirement.
- Mill and fill one lane at a time so both joints are confined.

Density is Driven By…..

- Good Mix Design
- Adequate Density
- Proper Lift Thickness

Longitudinal Joint Enhancements

- Joint Adhesives
- Fogging of longitudinal joint after construction.

Current Specification Considerations

- Modify Level 4 and Level 5 mixes to 60 gyrations.
  - Would require contractor to add 0.1-0.2 more asphalt binder in mixture. And, should improve ability to densify those mixes.
    - » Concern…..potential for rutting??

Thank You